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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 22

Application Number: 09/383,876
Filing Date: August 26, 1999
Appellant(s): RAEDER, CHRISTOPHER H.

Robert J. Crawford
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed on 10 October 2002.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existance of any related appeals and interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-12 and 14-19 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,664,987	RENTELN	9-1997
6,113,462	YANG	9-2000
6,227,947	HU ET AL	5-2001

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4, 6, 8, 10-12, 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Renteln (USPN 5,664,987). Renteln inherently discloses a method for chemical mechanical polishing (CMP) a wafer using a CMP apparatus 10 having a polishing table 16 including a polishing pad 202 and a wafer carrier 26 adapted to carry a wafer 200 relative to a center of the polishing table 16 comprising using the polishing pad 202, polishing the wafer 200 at a position relative to the center, determining that the wafer 200 is being polished in a center-offset manner by measuring the removal rate across the radius of the wafer, as a function of the wafer 200 being polished in the center-offset manner by recognize that the removal rate across the radius of the wafer is not uniform, conditioning the pad 202 and positioning the wafer carrier 26 misaligned with respect to the pad 202, wherein the center-offset manner includes a center-fast or center-slow manner since the wafer rotates against the rotating pad, the rotational speed at the edge of the wafer is higher than at the center of the wafer, and including inspecting a wafer during the polishing process, removing the wafer from the carrier and manually inspecting the wafer, including arranging a conditioning wheel 220 over the

pad 202 and relative to the center of the polishing table. Renteln also discloses an arrangement for chemical mechanical polishing comprising a polishing pad 202 arranged to rotate, a wafer carrier arranged to carry a wafer 200, rotate, and hold the wafer 200 face-down on the polishing pad 202, a detection arrangement adapted to detect whether the wafer is polishing in a center-offset manner by measuring the removal rate across the radius of the wafer, a conditioning device 220 adapted to condition the pad 202, both the conditioning device 220 being arranged, and the wafer carrier being misaligned, relative to the polishing pad 202 as a function of the wafer having been polished in a center-offset manner (note Fig. 3, abstract, col. 3, line 41 to col. 5, line 4).

Claims 5, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Renteln (USPN 5,664,987) in view of Yang (USPN 6,113,462). Renteln discloses the claimed invention as described above, however, Renteln does not disclose arranging a conditioning wheel comprises thinning the pad. Yang discloses thinning a pad by conditioning (note col. 7, lines 48-60). It would have been obvious to one having ordinary skill in the art at the time the invention was made that conditioning a pad comprises thinning a pad as disclosed by Yang in order to alter a thickness of a pad.

Claims 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Renteln (USPN 5,664,987) in view of Hu et al (USPN 6,227,947). Renteln disclosed the claimed invention as described above, however, Renteln does not disclose a supply arranged to supply conditioning material to a polishing pad and the conditioning material is water. Hu et al disclose a supply 70 arranged to supply conditioning material to a

polishing pad and the conditioning material is water (note Fig. 5, col. 8, lines 29-56). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Renteln with a supply as disclosed by Hu et al in order to provide a cleaning solution to condition a pad.

(11) Response to Argument

In response to Appellant's argument that groups 1-3 (claims 1-4, 6, 8, 10-12 and 17-19) includes determining that a wafer is being polished in a center-offset manner and as a function of the wafer being polished in the center-offset manner, conditioning a pad and positioning a wafer carrier misaligned with respect to the pad, which is not taught by prior art (Renteln). Renteln inherently discloses the step of determining that a wafer is being polished in a center-offset manner by measuring the removal rate of the wafer across the radius of the wafer, since the wafer rotates against a rotating polishing pad, the rotational speed at the center of the wafer is slower than the rotational speed at the edge of the wafer therefore the removal rate at the center of the wafer is slower than the removal rate at the edge of the wafer, which is a center-slow condition. Furthermore, depend on the surface topography of the wafer and level of pressure applied by the polishing pad to the center of the wafer, the removal rate at the center of the wafer is faster than the removal rate at the edge of the wafer, which is a center-fast condition. As Renteln recognizes that the removal rate is different across the wafer or as a function of the wafer being polished in a center-offset manner, Renteln determines the amount of conditioning required to applied to the polishing pad to achieve a desire removal rate (note abstract, Fig. 3, col. 1, lines 61-65, col. 2, lines 32-38, col. 4, lines 1-

14 and lines 29-34). Particularly, in response to appellant's claim that as a function of the wafer being polished in the center-offset manner, positioning a wafer misaligned with respect to the pad, the examiner found no support for the claim in the instant application. Appellant discloses in page 4, lines 20-21, "The pad is conditioned as a function of determining that the wafer is being polished in the center-offset manner." However, appellant has not disclosed that positioning a wafer carrier misaligned with respect to the pad, as a function of the wafer being polished in the center-offset manner as specifically claimed.

In response to Appellant's argument that group 4 (claims 5, 7 and 9) teaches thinning the center, the edge or the location of the pad where is thick relative to the rest of the pad, which are not taught by prior art (Renteln and Yang). Renteln discloses a method and apparatus for determining the amount of conditioning required to be applied to the polishing pad based on measured removal rate as a function of wafer radius and the polishing pad is conditioning in according with the changes in the removal rate, therefore, Renteln inherently discloses that the polishing pad is conditioned at the center of the pad, the edge of the pad or at a location of the pad where is thick relative to the rest of the pad to compensate for the change in the removal rate of the wafer. Yang discloses the conditioning of the pad comprising thinning the polishing pad (col. 2, line 62 to col. 3, line 6, col. 3, lines 56-60 and col. 7, lines 48-60). Therefore, it would have been obvious to one having ordinary skill in the art that conditioning of the polishing pad would be thinning the polishing pad to provide more uniform removal rate across the wafer.

In response to Appellant's argument that groups 5 and 6 (claims 14-16) teach supplying conditioning material responsive to a detection arrangement, which is not taught by prior art (Renteln and Hu). Renteln discloses that during polishing and conditioning process, abrasive slurry is fed to the polishing pad surface. Hu et al disclose that in addition to a first nozzle for spraying a slurry solution onto the top surface of the polishing pad, a second nozzle is provided for dispensing a cleaning solution capable of dissolving polishing debris on the surface of the polishing pad (col. 6, lines 1-13, col. 8, lines 29-56). It would have been obvious to one having ordinary skill in the art to include the cleaning solution in the conditioning process for removing debris formed on the polishing surface.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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December 3, 2002

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